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A discourse concerning the Sepulchral Lamps of the Ancients, shewing the possibility of their being made divers waies, read before the Philosophical Society of Oxford, May the 7. 1684. by Robert Plot LL. D. Director of Experiments to the said Society.

Mr. President and Gentlemen,

YOU may well remember that at the last meeting, I shewed you that the downy part of the *Mineral* call'd *Linum Asbestinum*, *Earth-flax*, or *Salamanders Wooll*, would make, and do the office of a *Weik* tolerably well; it having burnt from about nine in the morning (being still supplied with Oyl) till about four in the afternoon (about what time that *Session* broke up) without sensible diminution: yet it was objected that upon other trials a *friability* had been found in it, which argued some sort of *consumption*; and that allowing it invincible in the fire, yet there might be some danger of its being *clog'd* by the *impurities* of the best Oyl that could be got, or any way prepared. To the first of which *Objections* it was then answer'd, that there was no such absolute necessity of making use of that *Wooll*, but that another *Weik* might be contriv'd, against which that exception could not lye; such as a *Metallin Wire*, especially of the best refined *Gold* (whose prerogative it is, not to be diminish'd by fire) that will lick up Oyl as well as any other *Weik*, and so make a *perpetual flame*, provided it be supplied with a *perpetual Oyl*: this I must confess I have often heard asserted, but never applied my self to the trial of the *Experiment*, till I received your commands to do it the last week; in execution whereof I found that in a *Faggot* of *Wire* made

made of *anneal'd Iron*, of a futable bignefs for a *Week*, it would not fucceed by any manner of means I could readily think of; nor have I much reafon to think it will, after the moft mature deliberation, either in *Wire of Silver* or *Gold* (though I dare not pronounce the contrary till trial has been made) the nature of them all feeming not much different, as to *this particular*. If therefore it be neceffary, that we muft have a perpetual *Week* for the making fuch perpetual *Sepulchral Lamps*, as were ufed by the *Ancients*, I think we muft ftick to the firft kind, made of *Linum Asbestinum*, or *Salamanders-wool*; which if it any way can be fupplied with a *perpetual Oyl* (as I fhall prefently fhew you) I hope you will not judg me far from effecting the matter. Now that there may be fuch a *Bitumen* or *inexhaufible Oyl*, I fhall not need to trouble you with the *Testimonies* of old *Authors*, or carry you into *Italy*, or other forreign parts: for will you but allow me an *inconfumable Week*, I will carry you no further than *Pitchford* in *Shropfhire*, where there is a *Naphta* or *liquid bitumen* (a *Specimen* whereof I have here to fhew you) that constantly iffues forth with a *Spring* there, and floats upon the *Water*: *this* I would have feparated before it joynes with the water into a *ductus* of its own, and fo conveyed to the place, thought moft convenient for fuch a *Lamp*, into which it fhould as perpetually diftill, as it does now into the *fountain*; which I doubt not but you will allow may be done, without any great matter of difficulty: and if fo, we have an *Oyl*, as *everlafting* as our *Week*: nor need we to fear any *extinction* if inclofed in a *Tomb* or *Vault* underground, in never fo damp or moift a place; it being the *Charaacteriftic* of a *bitumen*, to burn beft where there is moifture, as is evident upon affufion of water upon *Sea-coal*. And this is one way I have thought of, that fuch a *perpetual Sepulchral Lamp* might poffibly be contrived. But if you will be fo ftrict with me, as not to allow

this to be a *perpetual Weik*, or that 'tis probable one should be made any other way; as unlikely may it seem to most (that I say not to this *Society*) that there was ever any such thing as a *perpetual Lamp*; notwithstanding the *Testimonies* of *St. Austin*, *Plutarch*, *Pliny*, *Ludovicus Vives*, *Baptista Porta*, *Lacetus*, *Pancirollus*, and divers others, whereof some are said to have burnt a 1000, some 1500 years. But I dare not think so many, and so very good *Authors*, have all imposed upon us, or that 'tis almost possible that so many notable instances as are brought for them, should all be false. Much rather therefore shall I determine (than wholly explode the thing) that the *liquor* of these *Lamps* did burn without any *Snuff* or *Weik* at all, as we see *Camphore* and most *bitumens* will, it not being express'd (that I remember) scarce in any of the *relations* of these *Lamps*, that they were found with any *Weiks*, whence both the inconveniencies above mention'd attending a *Weik*, *ipso facto* cease. It only therefore remaining that we find out an *inexhaustible Oyl*, which conveyed to a fit vessel might cause such a *Lamp*; why may not our *bitumen* at *Pitchford* serve the turn? which no question will burn without a *Weik*, as well as any other *liquid bitumen*: for I begged not above in this instance the favour of a *Weik* out of necessity, but that I was willing to shew the probability of its being done as many waies as I could. All the objection I can foresee that is likely to obtain advantage against such an *Experiment*, is that such a *Lamp* as this, would as likely burn in the *open Air*, as in an inclosed damp *Vault*, whereas the *Lamps* of the *Ancients* did nourish their flame best, where there was most want of *Air*, only in close *Vaults* and *Tombs*, and were presently extinguish'd upon the least immission of *External Air*, these being qualities necessary, and almost alwaies asserted as concomitants of the Ancient *Sepulchral Lamps*. To which I answer first, that some of the *Lamps* of the *Ancients*,

cients, did as well burn in the open *Air*, as in close damp *Vaults*, as that mention'd by *St. Austin* in his book *de Civitate Dei*, which hung in the *Temple* of *Venus* alwaies expos'd to the open weather, yet was never either consumed or extinguish'd. The *Lamp* also found in the *Tomb* of *Pallas* the *Arcadian*, slain by *Turnus* in the *Trojan War*, was of this kind, which remain'd burning after it was taken forth, notwithstanding either *Wind* or *Water*, with which some did endeavor to quench it. Now admitting our *Lamp* at *Pitchford* should thus burn indifferently under both circumstances, what are we the worse? Since I never heard that the *Lamp* mention'd by *St. Austin*, or of *Pallas*, were ever the less esteem'd or admir'd, because they could not be extinguish'd by the open *Air*, as most of the rest have been said to be. But if any body be so wise that He must have an *Oyl* in all particulars answerable to that other sort of the *Antients*, that burns best where there is want of *Air*, and is destroyed by its admission: let Him but go with me into *Flint-shire* to the *Coale-works* of *Sr. Roger Mostyn* of *Mostyn* in that *County*, and He may have satisfaction; where the *Miners* when they have dugg'd so deep, that they begin to perceive a want of *Air*, find a blewish flame to begin to kindle of it self in the fissures of the *Coal* (at which, by way of sport, they sometimes light their *Candles*) which blazes, and moves up and down continually, and sometimes shines too upon the surface of the water in the bottom of the *Pits*, shewing all the colours of the *Rainbow*: which yet upon drawing up of the water that annoyes the *works*, and thereby stirring the *Air*, will leave burning; but as they sink lower, and are more remote from the *day* or superterraneous *Air*, still increases upon them: whence it plainly appears that this is a sort of *fire* that so little requires *Air* for the maintenance of it; that it burns best when there is least *Air*, and is extinguish'd when disturb'd by the motion of it;

as the ancient *Lamps* are said to be, upon the *inmission* of *external Air*. This therefore must be the fire fittest for this sort of *Sepulchral Lamps* (for it seems they were not all alike) for the account whereof, we all stand obliged to an eminent member of this *Society*, the learned Dr. *Bathurst Dean of Wells*, and *President of Trinity College Oxon*. By whose care the relation of the strange *Phænomena* of this sort of *fire*, stand registered in the *Philosophical Transactions*, Numb. 136. to all posterity. Since which it has also been taken notice of, in the *Coal-works* of *Somersetshire*, by the ingenious Mr. *Beaumont*; and by Mr. *George Sinclair* in the *Coal-works* of *Scotland*. This I doubt not but you will readily allow me to be as probable a material for the *Oyl* of this second sort of *perpetual Lamps*; as that of *Pitchford* was, for the former: But how *this*, or *that*, shall be so menaged, as to be put into a *Lamp*, and this *Lamp* perpetually supplied, and placed wherever it shall be desired; as it seems the *Lamps* of the *Ancients* might, this *fire* being sometimes found in little *Pots*, *Glasses* or *Urnes*, without any such *ductus* to them as we required at *Pitchford*, or might do here; is a difficulty perhaps not easily conquered. To which I must confess that I have only this to say, that unless there can be a preparation *Chymically* made out of these *bituminous materials*, which thus naturally take fire of themselves, or preserve it without a *Work*, a small quantity whereof shall maintain so tenuious a *flame* as that there shall be no considerable consumption of the matter in many years (such as the flame over the *Well*, and *Earth* about it, in one Mr. *Hawkley's* ground in *Lancashire*, that (like the fire of *Plato*) only *shines* and does not *burn*) we must be contented to be tyed to the places where these *materials* are. But if we can be content to quit these *materials*, and to think that these *Lamps* (as many have done) did not *shine* or *burn* for all the time they were inclosed in these *Tombs*, but were only
inkindled

inkindled by the *admission* of *Air* when open'd: I have thought of a way not at all lyable to any of the defects or inconveniencies, of the two former waies; whereby a *Glass* of *liquor* inclosed in another (like the *Urns* of *Olybius*) upon *immission* of *external Air*, shall certainly *shine*, though it did not so before. And 'tis this: take a small *Phial*, into which put a little of the *liquid Phosphorus* (which you all know, if the *Phial* be stopt, *shines* not at all, the *external Air* being excluded from it) include this in another *Glass*, as suppose the *recipient* of an *Air-pump*, out of which if the *Engin* be stanch, so that the *Air* may be well exhausted, the *solid Phosphorus* it self, will leave off *shining* in ten hours time, though in the Summer-quarter; and the *liquid* in fewer, so that it shall *shine* no more, than when the bottle containing it, is stopt with a *Cork*; and both of them will be extinguisht proportionably in a yet less time, if the *Air* be taken from them in the *Winter* season; as has been frequently experimented by my worthy Friend *Frederick Slare M. D.* and shall again be repeated as soon as I can procure a nice *Air-pump* fit for the purpose. Now let such an *exhausted Recipient* with the included *Phosphorus*, be placed in a *Tomb* or *Vault* which are commonly dark, and if ever found, and the outer *Glass* broken (as usually such things are, by ignorant Men imployed in digging) possibly there will appear, upon *immission* of the *Air*, as good a *perpetual Lamp*, as some that have been found in the *Sepulchres* of the *Ancients*, tho in all probability of a different kind, from all, or most of them.